

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION FOR UNITED STATES PATENT

AN INTERNET PROTOCOL BASED 911 SYSTEM

INVENTOR

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AN INTERNET PROTOCOL BASED 911 SYSTEM

PRIORITY CLAIM

[0001] This patent application is non-provisional patent application of U.S. provisional patent application serial number 60/441,632 filed on January 21, 2003.

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FIELD OF THE INVENTION

[0002] The present invention relates generally to the field of communications and, more particularly, to an Internet Protocol based 911 system.

BACKGROUND OF THE INVENTION

10 [0003] There are many systems for providing 911 services to cellular phones. But these systems are not designed to work in Internet Protocol ("IP") or voice over IP ("VoIP") systems. These systems do not have no way to match a location or address to an IP address because an IP address does not have a physical address or telephone number associated with it. Accordingly, there is a need for an IP based 911.

SUMMARY OF THE INVENTION

15 [0004] The present invention provides software applications that communicate with Global Positioning Systems ("GPS") hardware embedded in Internet Protocol ("IP") enabled equipment such that when the equipment is used to access emergency services by entering 911 or pressing an emergency activation button, the software provides the means to determine the location of the calling equipment to the respective emergency service center
20 appropriate to the location of the emergency. More specifically, the software monitors the voice over IP ("VoIP") software installed on the IP enabled equipment. When 911 is entered, the software acquires the vertical and horizontal coordinates ("V&H") from the GPS hardware, overrides the installed VoIP software to send a Session Initiation Protocol ("SIP") request to an address server which is also monitoring the Internet for these specific sessions.
25 The address server accepts the SIP from the originating hardware, receives the V&H and accesses a database that cross references emergency services direct dial numbers with the

V&H. The address server passes the voice call and the available direct dial numbers to a call center that handles emergency voice interface with the person who entered 911 at the originating equipment. The call center operator chooses which emergency service to dial after speaking with the person who has the emergency, or defaults to the fire rescue number.

5 **[0005]** The present invention is applicable to both wireline and IP telephony systems, such as laptop computers, PDAs, etc. The present invention does not rely on a set IP address, so that it will work on virtual networks and with transactional IP addresses. GPS coordinates are cross referenced to the closest physical emergency services. For example, the system may provide four numbers or more number to the operator (police, fire, poison control,
10 emergency medical services, rescue, etc.). The operator selects the appropriate number and routes the call via PSTN or directly to the IP address. Note that this invention does not required fixed equipment and is primarily designed for stationary or portable voice or IP enabled devices rather than mobile phones. The present invention completes the IP telephony service.

15 **[0006]** The present invention provides a method for initiating an emergency IP request using an IP enabled device having GPS capability. The method includes monitoring the IP enabled device for one or more emergency criteria, and obtaining global positioning data using the GPS capability and sending the emergency IP request whenever the one or more emergency criteria are satisfied. This method can be implemented as a computer program
20 embedded in a computer readable medium wherein the steps are performed by one or more code segments.

[0007] The present invention also provides a method for handling an emergency IP request from an IP enabled device having GPS capability. The method includes receiving the emergency IP request containing global positioning data for the IP enabled device, obtaining
25 local emergency services data based on the global positioning data, dialing a call center station based on the local emergency services data and passing an emergency call from the IP enabled device to the call center station. This method can be implemented as a computer program embedded in a computer readable medium wherein the steps are performed by one or more code segments.

[0008] In addition, the present invention provides an apparatus having an IP enabled device, a GPS component within the IP enabled device and an emergency IP component within the IP enabled device. The emergency IP component monitors the IP enabled device for one or more emergency criteria, and obtains global positioning data from the GPS component and sends the emergency IP request whenever the one or more emergency criteria are satisfied.

[0009] Moreover, the present invention provides a system having an address server and a database communicably coupled to the address server. The address server receives an emergency IP request containing global positioning data for an IP enabled device, obtains local emergency services data based on the global positioning data and provides emergency information to one or more emergency services based on the local emergency services data.

[0010] Other features and advantages of the present invention will be apparent to those of ordinary skill in the art upon reference to the following detailed description taken in conjunction with the accompanying drawings.

15 BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The above and further advantages of the invention may be better understood by referring to the following description in conjunction with the accompanying drawings, in which:

FIGURE 1 depicts an IP based 911 system in accordance with one embodiment of the present invention;

FIGURE 2 is a flowchart illustrating the 911 software process in accordance with one embodiment of the present invention; and

FIGURE 3 is a flowchart illustrating the address server process in accordance with one embodiment of the present invention.

25 DETAILED DESCRIPTION OF THE INVENTION

[0012] While the making and using of various embodiments of the present invention are discussed in detail below, it should be appreciated that the present invention provides many applicable inventive concepts that can be embodied in a wide variety of specific contexts.

The specific embodiments discussed herein are merely illustrative of specific ways to make and use the invention and do not delimit the scope of the invention.

[0013] The present invention provides software applications that communicate with Global Positioning Systems (“GPS”) hardware embedded in Internet Protocol (“IP”) enabled equipment such that when the equipment is used to access emergency services by entering 911 or pressing an emergency activation button, the software provides the means to determine the location of the calling equipment to the respective emergency service center appropriate to the location of the emergency. More specifically, the software monitors the voice over IP (“VoIP”) software installed on the IP enabled equipment. When 911 is entered, the software acquires the vertical and horizontal coordinates (“V&H”) from the GPS hardware, overrides the installed VoIP software to send a Session Initiation Protocol (“SIP”) request to an address server which is also monitoring the Internet for these specific sessions. The address server accepts the SIP from the originating hardware, receives the V&H and accesses a database that cross references emergency services direct dial numbers with the V&H. The address server passes the voice call and the available direct dial numbers to a call center that handles emergency voice interface with the person who entered 911 at the originating equipment. The call center operator chooses which emergency service to dial after speaking with the person who has the emergency, or defaults to the fire rescue number.

[0014] The present invention is applicable to both wireline and IP telephony systems, such as laptop computers, PDAs, etc. The present invention does not rely on a set IP address, so that it will work on virtual networks and with transactional IP addresses. GPS coordinates are cross referenced to the closest physical emergency services. For example, the system may provide four numbers or more number to the operator (police, fire, poison control, emergency medical services, rescue, etc.). The operator selects the appropriate number and routes the call via PSTN or directly to the IP address. Note that this invention does not required fixed equipment and is primarily designed for stationary or portable voice or IP enabled devices rather than mobile phones. The present invention completes the IP telephony service.

[0015] Referring now to FIGURE 1, an IP based 911 system 100 is depicted in accordance with one embodiment of the present invention. The system 100 includes one or more IP

enabled devices 102, 104, 106 and 108, an address server 110, a database 112 and one or more call center stations 114. The IP enabled devices can be a PCMCIA card 102, PCI card 104, IP Phone 106 or other IP enabled device 108 (e.g., a personal data assistant, computer, etc.) all of which are equipped with GPS capability (a GPS component or hardware). In addition, the IP enabled devices 102, 104, 106 or 108 may be part of or attached to another device, such as a computer. Each IP enabled device 102, 104, 106 and 108 is also equipped with an instance of 911 IP software 116, which is also referred to as an emergency IP component. The IP enabled devices 102, 104, 106 and 108 are communicably coupled to the address server 110 via the devices' standard connection to a wide area network, such as the Internet. The address server 110 is communicably coupled to the database 112 via a direct connection, local area network, wide area network or other standard connections. The address server 110 is communicably coupled to the call center station 114 via local area network, wide area network or the Internet. The call center station 114 can place a PSTN direct dial call to any emergency service as is required by the circumstances, such as police 118, fire 120, poison control 122, emergency medical service 124, or other entity.

[0016] The 911 IP software 116 monitors the IP enabled device 102, 104, 106 or 108 for one or more emergency criteria, which may include entry of an emergency code, a 911 signal, a panic signal, an emergency activation button, a sensor alarm (e.g., collision, heat, smoke, vital signs, etc.) or an emergency condition specific signal (e.g., fire, police, ambulance, etc.). If the one or more emergency criteria are satisfied, the 911 IP software 116 obtains global positioning data (e.g., vertical and horizontal coordinates, a longitude, a latitude and an altitude for the IP enabled device 102, 104, 106 or 108) from the GPS component and sends an emergency IP request to the address server 110 via the network (not shown). The emergency IP request is SIP request or similar message containing the global positioning data.

[0017] Once the address server 110 receives the emergency IP request, the address server 110 obtains local emergency services data based on the global positioning data, dials the call center station 114 (e.g., an emergency services operator, etc.) based on the local emergency services data and passes an emergency call from the IP enabled device 102, 104, 106 or 108 to the call center station 114. The address server 110 may also provides a telephone number for one or more local emergency service providers 118, 120, 122, 124 to the call center

station 114 based on the local emergency services data. The local emergency service providers may also include an emergency call center, coast guard, military, federal agency or rescue unit. The address server 110 may also provide the global positioning data to the call center station 114.

5 [0018] Now referring to FIGURE 2, a flowchart illustrating the 911 software 116 (FIGURE 1) process 200 in accordance with one embodiment of the present invention is shown. The 911 software 116 (FIGURE 1) 200 or emergency IP component starts in block 202 and monitors the IP enabled device 102, 104, 106 or 108 (FIGURE 1) in block 204. Whenever one or more emergency criteria are satisfied, such as the user enters an emergency
10 code, a 911 signal, a panic signal, an emergency activation button, a sensor alarm (e.g., collision, heat, smoke, vital signs, etc.) or an emergency condition specific signal (e.g., fire, police, ambulance, etc.), as determined in decision block 206, the 911 software 116 (FIGURE 1) imbeds the global positioning data from the GPS into an emergency IP request or SIP request in block 208 and sends the SIP request to the address server 110 (FIGURE 1)
15 in block 210. Thereafter, the process continues to monitor the IP enabled device 102, 104, 106 or 108 (FIGURE 1) in block 204 and repeats the process as previously described. If, however, the user does not dial 911 or activate an emergency button, as determined in decision block 206, the 911 software 116 (FIGURE 1) continues to monitor the IP enabled device 102, 104, 106 or 108 (FIGURE 1) in block 204 and repeats the process as previously
20 described. This method can be implemented as a computer program embedded in a computer readable medium wherein the steps are performed by one or more code segments.

[0019] Referring now to FIGURE 3, a flowchart illustrating the address server 110 (FIGURE 1) process 300 in accordance with one embodiment of the present invention is shown. The address server 110 (FIGURE 1) process 300 starts in block 302 and receives an
25 emergency IP request or SIP request from an IP enabled device 102, 104, 106 or 108 (FIGURE 1) in block 304. The local emergency services data, such as one or more direct dial numbers, is then obtained from the database 112 (FIGURE 1) using data contained in the SIP request, such as the global positioning data, in block 306. The address server 110 (FIGURE 1) then dials a call center station 114 (FIGURE 1) based on the local emergency
30 services data, which may be one of the local emergency service numbers or emergency services operator, in block 308. The emergency call is then passed to the call center station

114 (FIGURE 1) in block 310 and ends in block 312. The address server 110 (FIGURE 1) may also provides a telephone number for one or more local emergency service providers 118, 120, 122, 124 (FIGURE 1) to the call center station 114 (FIGURE 1) based on the local emergency services data. In addition, the address server 110 (FIGURE 1) may provide the
5 global positioning data to the call center station 114 (FIGURE 1). Note that the address server 110 (FIGURE 1) may continue to monitor the emergency call. The call center station 114 (FIGURE 1) then determines how to handle the emergency call and may route the call to the police 118 (FIGURE 1), fire 120 (FIGURE 1), poison control 122 (FIGURE 1), emergency medical service 124 (FIGURE 1) or other appropriate entity (e.g., coast guard,
10 military, federal agency, rescue unit, etc.). This method can be implemented as a computer program embedded in a computer readable medium wherein the steps are performed by one or more code segments.

[0020] Although preferred embodiments of the present invention have been described in detail, it will be understood by those skilled in the art that various modifications can be made
15 therein without departing from the spirit and scope of the invention as set forth in the appended claims.